UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/858,147	05/14/2001	Rustem Osmanow	LMPY-11610	2518

7590 09/12/2002

Andrew V. Smith
Sierra Patent Group, Ltd.
P.O. Box 6149
Stateline, NV 89449

EXAMINER
MENEFEE, JAMES A

ART UNIT	PAPER NUMBER
2828	#10

DATE MAILED: 09/12/2002

Due 12/12/02 apl

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/858,147	OSMANOW ET AL.	
	Examin r	Art Unit	
	James A. Menefee	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

PAUL IP
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

DETAILED ACTION

Response to Amendment

In response to the preliminary amendments filed 29 March 2002 and 24 June 2002, the specification is amended and claims 62-67 are added. Claims 1-67 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 10, 30-31, 35-40, 58-62, and 65 are rejected under 35 U.S.C. 102(b) as being anticipated by Wakata et al. (US 5,305,338, cited by App.). Wakata discloses the claimed invention as follows:

INDEPENDENT CLAIMS

Regarding claims 1 and 37, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. There is no mention of a step-up transformer disposed within the circuit after the switch.

Regarding claim 30, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of

electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. The solid-state switch 1 may be replaced by a number of IGBTs disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of IGBTs in series (Fig. 3, col. 2 lines 20-32). Thus, the switch can be configured to switch a voltage signal of between 12 and 25 kV.

Regarding claims 58-61, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. The solid-state switch 1 may be replaced by a number of IGBTs disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of IGBTs in series, thus the combinations of IGBTs as claimed are disclosed. (Fig. 3, col. 2 lines 20-32).

DEPENDENT CLAIMS

Regarding claims 2-4, 35-36, 38, 62, and 65, Wakata shows in Fig. 3 that the switch may include a plurality of switches disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of switches in series, thus the combinations of switches as claimed are disclosed.

Regarding claims 5 and 39, the solid-state switch 1 may be replaced by a number of IGBTs disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of IGBTs in series (Fig. 3, col. 2 lines 20-32). Thus, the switch can be configured to switch a voltage signal as claimed.

Regarding claims 6-7, 31, and 40, the rise time of a voltage applied to the electrodes is 100-300 ns, and switch time is less than 50 ns (col. 5 lines 5-26). See the discussion of the anticipation of ranges in MPEP 2131.03.

Regarding claim 10, the capacitors will be as claimed to promote the normal operation fo the device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakata. Wakata discloses the limitations of these claims as shown in the rejection of claim 1 above, but does not disclose the following:

Regarding claims 8-9, it is not disclosed that there is an additional load between the discharge electrodes and the peaking capacitor, the additional load being a resistor. It is well known in the art to include a load resistor in such a position. It would have been obvious to one

skilled in the art to include this additional load resistor because the additional resistor would have reduced the current through the electrodes, as is well known.

Claims 11-12, 55, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakata in view of Gordon. (US 5,815,386). Wakata discloses the limitations of these claims as shown in the rejection of claim 1 above, but does not disclose that there be a protective circuit parallel to the switch for protecting the switch, said protective circuit including a diode and a saturable inductor. Gordon teaches a circuit having an IGBT switch 34 and having a protective circuit in parallel with the switch, said protective circuit including a diode and saturable inductor (Fig. 2, 3a-c, col. 1 line 44 – col. 2 line 34). It would have been obvious to one skilled in the art to include such a protective circuit because these elements will protect the switch from voltage spikes, as taught by Gordon.

Claims 11, 13, 54, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakata in view of Desor et al. (US 6,020,723 cited by App.). Wakata discloses the limitations of these claims as shown in the rejection of claim 1 above, but does not disclose that there be a protective circuit parallel to the switch for protecting the switch, said protective circuit including a resistor and capacitor in series. Desor teaches a discharge circuit for an excimer laser having a IGBT switch 44 and having a protective circuit in parallel with the switch, said protective circuit including a resistor-capacitor series combination R4,C4 (Fig. 2,4, col. 5 line 65 – col. 6 line 4). It would have been obvious to one skilled in the art to include such a protective circuit because these elements will protect the IGBT, as taught by Desor.

Claims 14-22, 32-34, 41-47, 63, and 66-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakata in view of Mizoguchi et al. (US 5,754,579, cited by App.). Wakata discloses the claimed invention as follows:

INDEPENDENT CLAIMS

Regarding claim 14, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. There is no mention of a step-up transformer disposed within the circuit after the switch. It is not disclosed that the discharge circuit includes a voltage doubling circuit configured to double the voltage applied to a pulse compressor circuit before the voltage reaches the electrodes. Mizoguchi teaches embodiments of discharge circuits having solid-state switches such as in Wakata where there is a voltage doubling circuit that doubles the voltage of the pulse switched by the switch and applying this voltage to a pulse compression circuit before applying the voltage to the electrodes (Fig. 6-7). Mizoguchi teaches that these discharge circuits are obvious variants of the standard discharge circuit shown in Fig. 1 (col. 11 line 65-67), and therefore it would have been an obvious engineering design choice to substitute these art known variations into the discharge circuit of Wakata, as taught by Mizoguchi.

Regarding claim 45, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of

electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. There is not disclosed a voltage doubling circuit including a pair of capacitors for doubling the voltage of the pulse switched by the switch, and a pulse compression circuit for compressing the pulse for application to the electrodes. Mizoguchi teaches embodiments of discharge circuits having solid-state switches such as in Wakata where there is a voltage doubling circuit including a pair of capacitors that doubles the voltage of the pulse switched by the switch and applying this voltage to a pulse compression circuit before applying the voltage to the electrodes (Fig. 6-7). Mizoguchi teaches that these discharge circuits are obvious variants of the standard discharge circuit shown in Fig. 1 (col. 11 line 65-67), and therefore it would have been an obvious engineering design choice to substitute these art known variations into the discharge circuit of Wakata, as taught by Mizoguchi.

Regarding claim 47, Wakata discloses in Fig. 2 an excimer laser having a laser tube 5 filled with a laser gas and a known discharge circuit (Fig. 1) connected to a plurality of electrodes 9 for exciting the laser gas. There is inherently an optical resonator because this is necessarily a part of an excimer laser. The discharge circuit includes a solid-state switch 1 configured to switch a voltage needed to produce desired pulse energies. The switch may include a plurality of IGBTs for switching an electrical pulse provided by a main storage capacitor charged by a power supply. There is no mention of a step-up transformer disposed within the circuit after the switch. There is not disclosed a pulse compression circuit for compressing the pulse for application to the electrodes. Mizoguchi teaches embodiments of discharge circuits

having solid-state switches such as in Wakata where there is a voltage doubling circuit that doubles the voltage of the pulse switched by the switch and applying this voltage to a pulse compression circuit before applying the voltage to the electrodes (Fig. 6-7). Mizoguchi teaches that these discharge circuits are obvious variants of the standard discharge circuit shown in Fig. 1 (col. 11 line 65-67), and therefore it would have been an obvious engineering design choice to substitute these art known variations into the discharge circuit of Wakata, as taught by Mizoguchi.

DEPENDENT CLAIMS

Regarding claims 15 and 44, the solid-state switch 1 may be replaced by a number of IGBTs disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of IGBTs in series (Fig. 3, col. 2 lines 20-32). Thus, the switch can be configured to switch a voltage signal as claimed.

Regarding claims 16-18, 43, 63, and 66-67, Wakata shows in Fig. 3 that the switch may include a plurality of switches disposed in such a manner that there is an arbitrary number of parallel combinations, with each parallel combination having an arbitrary number of switches in series, thus the combinations of switches as claimed are disclosed.

Regarding claims 19-22, 31-34, 41-42, 46, Mizoguchi teaches the voltage doubling circuit of Figs. 6-7 includes a pair of capacitors in series whose first plate is connected to the output of the switch, and the second plate of a first of the pair of capacitors is connected to the pulse compressor circuit, and a second plate of a second of the pair of capacitors is connected to

ground. The limitations of claim 22 will occur in the normal operation of this voltage doubling circuit.

Claims 23-29, 48-49, 51-52, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakehata et al. (Appl. Phys. Lett., Dec. 1992). In view of Basting et al. (US 6,005,880, cited by App.). The claimed invention is taught as follows:

Regarding claims 23, 26, 48, and 51, Kakehata discloses a molecular fluorine laser system comprising a laser tube filled with gas, an optical resonator, a discharge circuit, and inherently a plurality of electrodes in the laser tube connected to the discharge circuit for exciting the laser gas. There is an oscillator discharge circuit and an amplifier discharge circuit, where a pulse applied to the amplifier is delayed from that applied to the oscillator discharge circuit. The output from the oscillator is directed into the tube of the amplifier at a same time as the discharge is applied to the amplifier, increasing the output of the laser to a desired level. There are switches connected to each of the discharge circuits. It is not disclosed that the switches may be solid state. Wakata teaches laser discharge circuits including solid state switches. It would have been obvious to one skilled in the art to replace the switches of Kakehata with Wakata's switch because this switch will not have the problems of instable discharge and temperature sensitivity, as taught by Wakata.

Regarding claims 24 and 27, due to the placement of the switch and discharge electrodes, the voltage across the switch is substantially the same as the voltage across the discharge electrodes of the oscillator laser, and is inherently less than required to produce a substantially similar level of output pulse energy without the amplifier.

Regarding claims 25 and 64 it is not disclosed that the switches comprise a plurality of IGBT's, more specifically a plurality of parallel combinations, with each combination including at least one IGBT. Wakata teaches such a switch in Fig. 3. It would have been obvious to one skilled in the art to replace the switch of Basting with Wakata's switch because this switch will not have the problems of instable discharge and temperature sensitivity, as taught by Wakata.

Regarding claim 28, the delay is controlled therefore the switches are synchronized.

Regarding claim 29, a trigger applied to the switches is delayed before the second switch.

Regarding claims 49 and 52, the electrical pulses will provide an output of the laser system at the desired energies, and there is no mention of a step-up transformer.

Claims 50 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakehata and Basting as applied to claims 23-29, 48-49, 51-52, and 64 above, and further in view of Ershov et al. (US 5,970,082, cited by App.). Kakehata and Basting teach all of the limitations of claims 23-29, 48-49, 51-52, and 64 as shown above, but do not teach that the resonator includes a line-narrowing module. Ershov teaches an excimer laser system in which the resonator includes a line narrowing module (col. 1 line 10 – col. 2 line 60). It would have been obvious to one skilled in the art to include a line narrowing module in the resonator because this will provide a laser beam having a narrow bandwidth, as taught by Ershov.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
September 4, 2002

PAUL IP
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800